SMORY CANYON WINE 053 0531



J.R. SIMPLOT COMPANY 1130 W. HIGHWAY 30 P.O. BOX 912 POCATELLO, IDAHO 83204 (208) 235-5602 FAX (208) 235-5699

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CORPORATE - POCATELLO OFFICE

November 4, 2015

US EPA NOV 0 6 2015

Mary Kauffman USDA Forest Service – Caribou National Forest 410 East Hooper Street Soda Springs, Idaho 83276 UAHO OPERATIONS OFFICE

Subject:

Smoky Canyon Mine Remedial Investigation/Feasibility Study (RI/FS)
Additional Wells Formation Aquifer Investigation in the Panel A Area

Boring Logs and As-Built Well Construction Logs for GW-29 and GW-30

Dear Mary:

Please find enclosed the Boring Logs and As-Built Well Construction Logs for new monitoring wells GW-29 (Boring ES-MW9) and GW-30. The information for GW-29 is included herein for documentation purposes as requested in your email dated July 21, 2015. For completeness, we are also submitting the information for GW-30.

The J.R. Simplot Company (Simplot) is submitting these documents, in accordance with the August 2009 Settlement Agreement/Consent Order, to address a Wells Formation groundwater data need identified in the northern area of the mine.

The electronic files are available for download at:

https://smokyrifs.formationclient.com/

Username: (b) (6)

Password (case sensitive): (b) (6)

Please contact me if you have any questions.

Sincerely,

Monty Johnson

Environmental Engineering Manager

Enclosures

cc: see attached distribution list

USEPA SF 1568655

SMOKY CANYON MINE – DISTRIBUTION LIST REMEDIAL INVESTIGATION/FEASIBILITY STUDY

Subject: Boring Logs and As-Built Well Construction Logs for GW-29 and GW-30

Date: November 4, 2015

<u>X</u>	Mary Kauffman (1 unbound hard copy) USDA Forest Service Caribou/Targhee National Forest Soda Springs District Office Attn: Smoky Canyon Site Record 410 E. Hooper St. Soda Springs, ID 83276	<u>x</u>	Mary Kauffman (1 hard copy) USDA Forest Service Caribou/Targhee National Forest 1405 Hollipark Drive Idaho Falls, ID 83401
X	James Alexander (1 CD only) USDA Office of the General Counsel 1220 SW Third Avenue Floor G, Room G002 (mail room) Portland, OR 97204	<u>X</u>	Alan Prouty, Burl Ackerman (2 hard copies) J.R. Simplot Company P.O. Box 27, One Capital Center 999 Main Street, Ste 1400 (mail room) Boise, ID 83707-0027
X	Wayne Crowther (1 hard copy) Idaho Dept. of Environmental Quality 444 Hospital Way, Suite 300 Pocatello, ID 83201	<u>x</u>	Monty Johnson (3 hard copies) Dennis Facer, Lori Hamann J.R. Simplot Company P.O. Box 912 1130 West Highway 30 Pocatello, ID 83204
X	Colleen O'Hara-Epperly (1 hard copy) Bureau of Land Management Pocatello Field Office 4350 South Cliffs Drive Pocatello, ID 83204	<u>x</u>	Chad Gentry (email only) Rachel Roskelley, Grant Williams, Dustin Hansen (3 hard copies) J.R. Simplot Company, Smoky Canyon Mine 1890 Smoky Canyon Mine Road Afton, WY 83110
<u>X</u>	Sandi Fisher (1 hard copy) US Fish and Wildlife Service 4425 Burley Drive, Suite A Chubbuck, ID 83202	<u>X</u>	Gary Billman (1 hard copy) Idaho Department of Lands 3563 Ririe Highway Idaho Falls, ID 83401
<u>x</u>	Matt Wilkening (1 hard copy) EPA, Idaho Operations Office 950 W. Bannock St., Suite 900 Boise, ID 83702	<u>X</u>	Kelly Wright (1hard copy) Env. Waste Mgmt. Program Shoshone-Bannock Tribes P.O. Box 306 Fort Hall, ID 83203
<u>X</u>	Ted Yackulic (1 CD only) EPA Region 10 Office of Regional Counsel (ORC-158) 1200 Sixth Avenue Seattle, WA 98101	<u>X</u>	Susan Hanson (1 hard copy) (b) (6)
<u>X</u>	Brady Johnson (1 hard copy) Idaho Dept. of Environmental Quality 1410 North Hilton Boise, ID 83706	<u>x</u>	Doug Scott (1 CD only) CH2M Hill 59 Lilac Court Pagosa Springs, CO 81147
<u>X</u>	Rick McCormick (2 hard copies) Allan Erickson CH2M Hill 322 East Front Street Suite 200 Boise, ID 83702	<u>x</u>	Fred Charles (3 hard copies) Buz Cotton, Len Mason Formation Environmental, LLC 2500 55 th Street Suite 200 Boulder, CO 80301

NOTE: Each hard copy report includes 1 complete CD

	ENVIRONMENTAL					(Page 1 of 14)
	J.R. Simplot Smoky Canyon Mine Caribou County, ID	Date Start/Finish Borehole Diameter Drilling Method Sampling Method	: 8" : Casin : Cuttin	gs	Logged By Drilling Comp te and Open Hole Ground Eleva Northing (NA	ation : 6971.6' AMSL .D 83) : 4729105 (est)
	Project Number: 009-004	Drilling Fluid	: Air, W	ater and	Foam Easting (NAD	0 83) : 491103 (est)
Depth in Feet	DESCRIPTION		nscs	GRAPHIC	REMARKS	Well: ES-MW9 TOC elev.: 6973.6'
0— - - 5—	(0 - 7.0) - Fill material used to construct topsoil, dark brown to brown, and easy d		Fill		Adavancing 8-inch casing using an under-reaming bit.	-8" Surface Casing
10	(7.0 - 70.0) - Alluvium/Colluvium consisti woody debris quickly grading to a brown variable gravel sized fragments compose chert, reddish brown to olive yellow siltst sandstone, and gray to light brown limes Fragments are subround to subangular, elongated. Variable fragment size from medium to comedium to coarse gravel. Variable comp	silty sand with ed of gray one and tone. flat and			Alluvium (Qal)/ Colluvium (Qco) Begin drilling with water and foam.	
25-30-35-	-Gray and black chert, -Olive yellow-pale brown siltstone, -White limestone, -Light gray siltstone with clacite stringers.		Qal/Qco	Drilling rotation en hammer not firing consistantly.		
40-45-50-						



(Page 2 of 14)

J.R. Simplot Smoky Canyon Mine Date Start/Finish

: 7/2 - 7/7/2014 : 8"

Logged By **Drilling Company** : JPL/LJM : Thomas Drilling

Caribou County, ID

Borehole Diameter Drilling Method Sampling Method

: Cuttings

: Casing Advance and Open Hole Ground Elevation Northing (NAD 83) : 6971.6' AMSL : 4729105 (est)

Project Number: 009-004

Drilling Fluid

: Air, Water and Foam

Easting (NAD 83)

: 491103 (est)

	Depth in Feet	DESCRIPTION	nscs	GRAPHIC	REMARKS	Well: ES-MW9 TOC elev.: 6973.6'
	50-	Variable fragment size from medium to coarse sand to medium to coarse gravel. Variable composition of fragments and trace calcite.			Rotation smoothing out.	8" Surface Casing
	55-	-Gray and black chert, -Olive yellow-pale brown siltstone, -White limestone, -Light gray siltstone with clacite stringers.				
	60		Qal/Qco			
oor	65—					
ngLogES-MW9.b	70-	(70.0 - 124.0) - Siltstone, brown to olive yellow, with some very dark brown siltstone fragments. Larger coarse gravel fragments can be broken and scratched with fingers. Some of the large fragments exhibit alternating laminations of olive yellow and dark brown			Lower Dinwoody Formation (Trdl). Hammer begins to fire consistantly.	
oring log\Borir	75— -	siltstone.				100 100 100 100 100 100 100 100 100 100
ES-MW9/b	80-					
moky\FieldNotes_DrillWellInstall\ES-MW9\boring log\BoringLogES-MW9.bor	85 —		Trdl			
moky\FieldNot	90-					

On 7/8/14 the WL=163' bgs and the borehole was air-lifted for three hours to remove approximately 6 borehole volumes while monitoring groundwater quality parameters. At the completion of air-lifting a sample was collected and analyzed for the constituents listed on Table 4 of the East Smoky EIS SAP.

The borehole was left with the 8-inch casing in place and a two foot stick-up with a welded cover.

04-01-2015 S:Jobs/0442-004-900-Simplot-Smoky/FieldNotes_DrillWellInstall\ES-MW9\boring log\BoringLogES-MW9.bor

95

100

FORMATION ES-MW9 Pilot Boring Log **ENVIRONMENTAL** (Page 3 of 14) J.R. Simplot Date Start/Finish : 7/2 - 7/7/2014 Logged By : JPL/LJM Smoky Canyon Mine Borehole Diameter : 8" **Drilling Company** : Thomas Drilling Caribou County, ID **Drilling Method** : Casing Advance and Open Hole Ground Elevation : 6971.6' AMSL Sampling Method : Cuttings Northing (NAD 83) : 4729105 (est) Project Number: 009-004 Drilling Fluid : Air, Water and Foam Easting (NAD 83) : 491103 (est) Well: ES-MW9 GRAPHIC TOC elev.: 6973.6' Depth DESCRIPTION REMARKS in Feet 100 Siltstone, olive yellow and dark brown, fragments are 8" Surface angular, medium to coarse sand with some coarse Casing gravel. 105 Hammer hitting well. Larger fragments easily scratched and broken with fingers. Trdl 115 S:Jobs\0442-004-900-Simplot-Smoky\FieldNotes_DrillWellInstall\ES-MW9\boring log\BoringLogES-MW9.bor 120 Trace black and gray siltstone fragments, increasing May have first encountered water at 120' bgs. (124.0 - 126.0) - Siltstone, 50% olive brown and 50% 125-Trdl (126.0 - 150.0) - Shale, gray, that is thinly bedded to laminated. Fragments are well graded, medium to coarse sand size with trace to some gravel sized, and angular. Larger fragments can be broken and Hammer hitting well. scratched with fingers. Fragments react slightly with acid but more vigorously when scratched. 135 Trdl

On 7/8/14 the WL=163' bgs and the borehole was air-lifted for three hours to remove approximately 6 borehole volumes while monitoring groundwater quality parameters. At the completion of air-lifting a sample was collected and analyzed for the constituents listed on Table 4 of the East Smoky EIS SAP.

Trace white calcite and olive brown to brown siltstone

140

145

150

04-01-2015

fragments.

The borehole was left with the 8-inch casing in place and a two foot stick-up with a welded cover.

Water being produced from borehole, difficult to determine volume because of water being used during

drilling.



(Page 4 of 14)

J.R. Simplot Smoky Canyon Mine Date Start/Finish

: 7/2 - 7/7/2014 : 8"

Logged By **Drilling Company** : JPL/LJM

Caribou County, ID

Borehole Diameter Drilling Method

: Casing Advance and Open Hole Ground Elevation

: Thomas Drilling : 6971.6' AMSL : 4729105 (est)

Sampling Method

: Cuttings

Northing (NAD 83)

	Project Number: 009-004	Drilling Fluid	: Air, V	Vater and	Foam Easting (NAD	83) : 491103 (est)
Depth in Feet	DESCRIPTION		nscs	GRAPHIC	REMARKS	Well: ES-MW9 TOC elev.: 6973.6'
150 – 150 – 150 – 150 – 150 – 150 – 150 – 150 – 150 – 150 – 160 –	acid but more vigorously when scratched acid but more vigorously with the scratched ac	medium to avel sized, and en and et slightly with ed.	Trdl		Formation producing more water with depth.	8" Surface Casing
On 7/8 remove parame analyze	/14 the WL=163' bgs and the borehole was air- e approximately 6 borehole volumes while mon- eters. At the completion of air-lifting a sample v ed for the constituents listed on Table 4 of the B	toring groundwater qual vas collected and		ne borehol th a welde	e was left with the 8-inch casing ad cover.	in place and a two foot stick-up

FORMATION ES-MW9 Pilot Boring Log ENVIRONMENTAL (Page 5 of 14) J.R. Simplot : 7/2 - 7/7/2014 Logged By : JPL/LJM Date Start/Finish Smoky Canyon Mine : 8" **Drilling Company** : Thomas Drilling Borehole Diameter Caribou County, ID Ground Elevation : 6971.6' AMSL Drilling Method : Casing Advance and Open Hole Sampling Method : Cuttings Northing (NAD 83) : 4729105 (est) Easting (NAD 83) Project Number: 009-004 Drilling Fluid : Air, Water and Foam : 491103 (est) Well: ES-MW9 GRAPHIC TOC elev.: 6973.6' Depth DESCRIPTION REMARKS Feet 200-Hammer hitting well. 8" Surface Casing Shale, gray, that is thinly bedded to laminated. Fragments are well graded, medium to coarse sand size with trace to some gravel sized, and angular. Larger fragments can be broken and scratched with fingers. 205-Fragments react slightly with acid but more vigorously Driller reports that the static water level in the borehole when scratched. may be as high as 120 feet because of the amount of water in the borehole 210 between casing runs. 215 S:\Jobs\0442-004-900-Simplot-Smoky\FieldNotes DrillWellInstall\ES-MW9\boring log\BoringLogES-MW9.bor 220 Trdl 225 230 235 240 An abrupt increase in (240.0 - 245.0) - Shale, olive brown, angular coarse formation water porduction. sand size fragments, with trace calcite and gray shale, Trdl larger fragments are laminated with black stringers.

Trdl

On 7/8/14 the WL=163' bgs and the borehole was air-lifted for three hours to remove approximately 6 borehole volumes while monitoring groundwater quality parameters. At the completion of air-lifting a sample was collected and analyzed for the constituents listed on Table 4 of the East Smoky EIS SAP.

trace calcite. Larger gravel sized fragments absent.

(245.0 - 262.5) - Shale, gray, with variable concentrations of olive brown to brown siltstone and

245

250

04-01-2015

The borehole was left with the 8-inch casing in place and a two foot stick-up with a welded cover.

Harder drilling.



(Page 6 of 14)

J.R. Simplot Smoky Canyon Mine Date Start/Finish

: 7/2 - 7/7/2014 : 8"

Logged By **Drilling Company** : JPL/LJM : Thomas Drilling

Caribou County, ID

Borehole Diameter **Drilling Method** Sampling Method

: Casing Advance and Open Hole : Cuttings

Ground Elevation Northing (NAD 83) : 6971.6' AMSL : 4729105 (est)

Project Number: 009-004

fragments absent.

255-

275

280

285

290

295

Drilling Fluid

: Air, Water and Foam

Easting (NAD 83)

: 491103 (est)

Depth in Feet	DESCRIPTION	nscs	GRAPHIC	REMARKS		ES-MW9 elev.: 6973.6'
250-	Shale, gray, with variable concentrations of olive brown				_ 	8" Surfa

8" Surface Casing

260-		Trdl	Abruptly easier drilling.
265—	(262.5 - 267.0) - Shale, olive brown to brownish yellow, mottled with black blebs and specks. Some gray fragments have a reddish veneer on them. Larger fragments have calcite and limestone stringers.	Trdl	
270-	(267.0 - 307.0) - Shale, gray, with trace calcite and olive brown siltstone. Fragments are angular coarse sand to fine gravel size.		Harder drilling.

fine gravel size.

to brown siltstone and trace calcite. Larger gravel sized

Some fragments easily broken with fingers.

Trdl

Hard slow drilling.

Water production ~100 to

150 gpm.

On 7/8/14 the WL=163' bgs and the borehole was air-lifted for three hours to remove approximately 6 borehole volumes while monitoring groundwater quality parameters. At the completion of air-lifting a sample was collected and analyzed for the constituents listed on Table 4 of the East Smoky EIS SAP.

The borehole was left with the 8-inch casing in place and a two foot stick-up with a welded cover.

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E	ENVIRONMENTAL		(Page 7 of 14)					
	J.R. Simplot Smoky Canyon Mine Caribou County, ID Project Number: 009-004	Date Start/Finish : 7/2 - 7/7/2014 Logged Borehole Diameter : 8" Drilling Of Sampling Method : Cuttings Northing Drilling Fluid : Air, Water and Foam Easting				: JPL/LJM any : Thomas Drilling tion : 6971.6' AMSL D 83) : 4729105 (est)		
Depth in Feet	DESCRIPTION		uscs	GRAPHIC	REMARKS	Well: ES-MW9 TOC elev.: 6973.6'		
300-	Shale, gray, with trace calcite and olive to Fragments are angular coarse sand to fit Some fragments easily broken with finge	ne gravel size.	Trdl			8" Surface Casing		
310-	(307.0 - 322.0) - Shale, olive with gray fr fragments increasing with depth, trace of sized fragments have calcite viens and s through both colors. Olive colored fragments easily broken than gray.	parse gravel tringers	Trdl		Hard drilling. Fast drilling, larger cutting fragments.			
315-	Gray siltstone increasing in concentration	n with depth.	Hui		Water production ~150 gpm.			
335-	(322.0 - 346.0) - Shale, gray, with trace t gray to olive siltstone. Both colors of silts vigorously with acid when crushed. Trace brown siltstone fragments.	stone react	Trdl		Difficult sample recovery because of the volume and velocity of water being discharged.			
345—	(346.0 - 383.0) - Alternating beds of gray olive to olive-brown shale with variable co of calcite. Fragment size is an angular co	oncentrations	Trdl		Hard drilling.			

		ORMATION	ES-MW9 Pilot Boring Log						
	E	NVIRONMENTAL					(Page 8 o	f 14)	
		J.R. Simplot Smoky Canyon Mine Caribou County, ID	Date Start/Finish Borehole Diameter Drilling Method Sampling Method	: 8" : Casir : Cutti	ngs	Logged By Drilling Con e and Open Hole Ground Ele Northing (N	vation : 6971.6 AD 83) : 472910	s Drilling ' AMSL 05 (est)	
		Project Number: 009-004	Drilling Fluid	: Air, V	Vater and	Foam Easting (NA	(D 83) : 491103	(est)	
	Depth in Feet	DESCRIPTION			GRAPHIC	REMARKS	Well: ES-MV TOC elev.: 6		
INES-MW9lboring log/BoringLogES-MW9.bor	350—	Alternating beds of gray shale and olive to olive-brown shale with variable concentrations of calcite. Fragment size is an angular coarse sand.		Trdl		Continued difficult sample recovery. Hard drilling and water production estimated at 200 gpm.		8" Surface Casing	
04-01-2015 S:\Jobs\0442-004-900-Simplot-SmokylFieldNotes_DrillWellInstall\ES-MW9\boring log\BoringLogES-MW9.bor	385— 	(383.0 - 451.0) - Shale, gray, angular confragments with trace medium gravel frag trace calcite.	arse sand size ments and	Trdl					
04-01-2015 S:\Jc	remove parame	14 the WL=163' bgs and the borehole was air-lift approximately 6 borehole volumes while monitoleters. At the completion of air-lifting a sample was do for the constituents listed on Table 4 of the Ea	oring groundwater qualit as collected and		ne borehol th a welde	e was left with the 8-inch casing d cover.	g in place and a two	foot stick-up	

Li	ORMATION	ES-MW9 Pilot Boring Log							
E	ENVIRONMENTAL						(Page 9 of 14)		
	J.R. Simplot Smoky Canyon Mine Caribou County, ID Project Number: 009-004	Date Start/Finish Borehole Diameter Drilling Method Sampling Method Drilling Fluid	: 8" : Casir : Cuttir		e and Open Hole	Logged By Drilling Compa Ground Elevat Northing (NAD Easting (NAD	ion : 6971.6' AMSL 0 83) : 4729105 (est)		
Depth in Feet 400 - 405-900-20045-0045-0	DESCRIPTION Shale, gray, angular coarse sand size fratrace medium gravel fragments and trace. Continued as above. Shale, gray, angular coarse sand size fratrace medium gravel fragments and trace.	agments with e calcite.	SOSO		REMA		Well: ES-MW9 TOC elev.: 6973.6' 8" Surface Casing		



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J.R. Simplot Smoky Canyon Mine Date Start/Finish

: 7/2 - 7/7/2014

Logged By

: JPL/LJM

Caribou County, ID

Borehole Diameter **Drilling Method**

: Casing Advance and Open Hole

Drilling Company Ground Elevation Northing (NAD 83) : Thomas Drilling : 6971.6' AMSL : 4729105 (est)

Project Number: 009-004

Sampling Method Drilling Fluid

: Cuttings : Air, Water and Foam

Easting (NAD 83)

: 491103 (est)

GRAPHIC Depth DESCRIPTION REMARKS in Feet

Well: ES-MW9 TOC elev.: 6973.6'

8" Surface

Casing

450 Trdl (451.0 - 460.5) - Shale, gray, grading to olive gray siltstone with calcite. Olive gray fragments are larger, coarse gravel size, and have calcite stringers and viens through them. Gray shale increasing with depth. 455 Inconsistent rotation of drill Trdl 460 Smooth rotation of drill rods. (460.5 - 505.0) - Shale, gray, angular coarse sand size Hard and slow drilling. fragments with trace medium gravel fragments and trace calcite. 465 Gray shale grading to a darker gray with fragments becoming harder to break between fingers and not easily scratched. When the scratched or crushed the

fragments react well with acid. 475 480 Trdl 485 490 Hard and slow drilling. 495

On 7/8/14 the WL=163' bgs and the borehole was air-lifted for three hours to remove approximately 6 borehole volumes while monitoring groundwater quality parameters. At the completion of air-lifting a sample was collected and analyzed for the constituents listed on Table 4 of the East Smoky EIS SAP

The borehole was left with the 8-inch casing in place and a two foot stick-up with a welded cover.

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500

No. of Concession,	ORMATION	ES-MW9 Pilot Boring Log							
E	NVIRONMENTAL			(Page 11 of 14)					
	J.R. Simplot Smoky Canyon Mine Caribou County, ID	Date Start/Finish Borehole Diameter Drilling Method Sampling Method	eter : 8" Drilling Company : Thomas : Casing Advance and Open Hole Ground Elevation : 6971.6'						
	Project Number: 009-004	Drilling Fluid		ater and					
Depth in Feet	DESCRIPTION		nscs	GRAPHIC	REMARKS	Well: ES-MW9 TOC elev.: 6973.6'			
500-	Gray shale grading to a darker gray with becoming harder to break between finge easily scratched. When the scratched or fragments react well with acid.	ers and not	Trdl		Advanced 8-inch casing	8" Surface Casing			
510—	(505.0 - 655.0) - Shale, gray, medium to size fragments, some fine angular grave fragments, fragments are flat and enlong fragments do not have any indication of structure. Fragments react weakly with a crushed.	l sized gated. Larger bedding or			using casing hammer into formation to seal off water above 500' bgs. Begin open hole drilling with a 7-7/8 inch tri-cone bit. Borehole dry from 505' to 540' bgs.	Entre to the total control con			
525—530—535—535—	Variable calcite content. Calcite reacts vith acid.	very strongly	Trdl			control of the contro			
540 —					Borehole water production ~100 gpm. Rough drilling.	The Control of the Co			
550						Some contraction of the contract			

On 7/8/14 the WL=163' bgs and the borehole was air-lifted for three hours to remove approximately 6 borehole volumes while monitoring groundwater quality parameters. At the completion of air-lifting a sample was collected and analyzed for the constituents listed on Table 4 of the East Smoky EIS SAP.

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	ORMATION		ES-MW9 Pilot Boring Log					
	ENVIRONMENTAL					(Page 12 of 14)		
	J.R. Simplot Smoky Canyon Mine Caribou County, ID Project Number: 009-004	Date Start/Finish Borehole Diameter Drilling Method Sampling Method Drilling Fluid	: 8" : Casir : Cuttir		Logged By Drilling Com se and Open Hole Northing (NA Foam Logged By Drilling Com Ground Elev Northing (NA Easting (NA	ration : 6971.6' AMSL AD 83) : 4729105 (est)		
Depth in Feet	DESCRIPTION		nscs	GRAPHIC	REMARKS	Well: ES-MW9 TOC elev.: 6973.6'		
550 – 555 – 560 – 570 – 575 – 580 – 590 –	Shale, gray, medium to coarse sand size some fine angular gravel sized fragment are flat and enlongated. Larger fragment any indication of bedding or structure. F weakly with acid unless crushed. Variable calcite concentrations.	s, fragments its do not have	Trdl		Hard drilling characterized by smooth drilling with occasional rough areas. Water production ~100-150 gpm.	The property of the property o		



(Page 13 of 14)

Caribou County, ID

Date Start/Finish

: 7/2 - 7/7/2014

Logged By

: JPL/LJM

Borehole Diameter Drilling Method

: Casing Advance and Open Hole

Drilling Company Ground Elevation : Thomas Drilling : 6971.6' AMSL

Project Number: 009-004

Sampling Method Drilling Fluid

: Cuttings : Air, Water and Foam

Trdl

GRAPHIC

Northing (NAD 83) Easting (NAD 83)

: 4729105 (est) : 491103 (est)

REMARKS

Hard drilling characterized by

Well: ES-MW9 TOC elev.: 6973.6'

Shale, gray, medium to coarse sand size fragments, some fine angular gravel sized fragments, fragments are flat and enlongated. Larger fragments do not have any indication of bedding or structure. Fragments react weakly with acid unless crushed.

DESCRIPTION

Variable calcite concentrations.

smooth drilling with occasional rough areas.

Open hole

Depth in

Feet

600-

605-

610

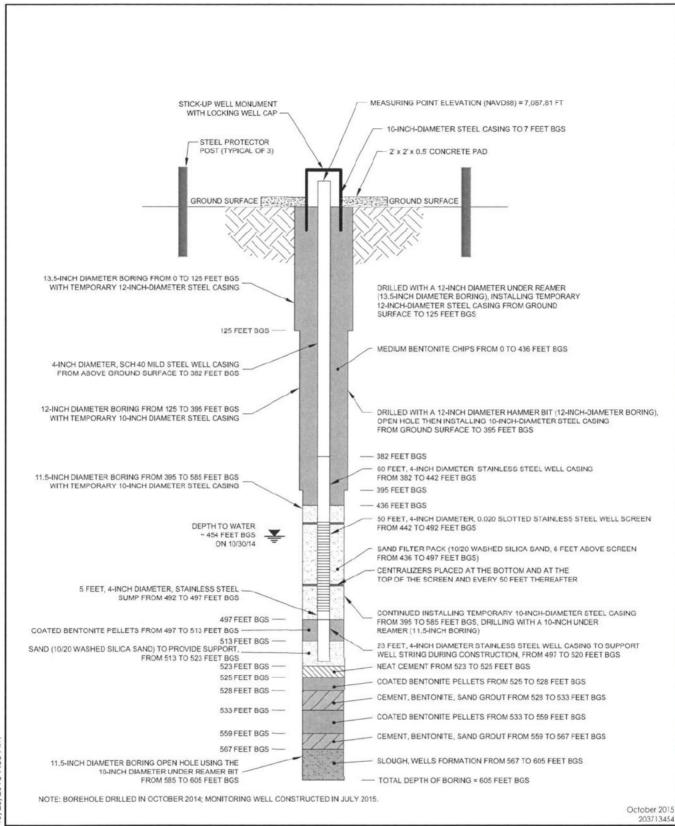
615

On 7/8/14 the WL=163' bgs and the borehole was air-lifted for three hours to remove approximately 6 borehole volumes while monitoring groundwater quality parameters. At the completion of air-lifting a sample was collected and analyzed for the constituents listed on Table 4 of the East Smoky EIS SAP.

The borehole was left with the 8-inch casing in place and a two foot stick-up with a welded cover.

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	F	ORMATION	ES-MW9 Pilot Boring Log						
	E	NVIRONMENTAL						(Pag	ge 14 of 14)
		J.R. Simplot Smoky Canyon Mine Caribou County, ID Project Number: 009-004	Date Start/Finish Borehole Diameter Drilling Method Sampling Method Drilling Fluid	: 8" : Casin : Cuttin		e and Open Hole	Logged By Drilling Compa Ground Elevat Northing (NAD Easting (NAD	any lion () 83)	: JPL/LJM : Thomas Drilling : 6971.6' AMSL : 4729105 (est) : 491103 (est)
ŀ		Project Number: 009-004	Drilling Fluid	: Air, W	rater and i	-oam	Easting (NAD	83)	: 491103 (est)
	Depth in Feet	DESCRIPTION			GRAPHIC	REMA	RKS		ES-MW9 elev.: 6973.6'
	650 — - - - 655 —	Shale, gray, medium to coarse sand size some fine angular gravel sized fragment are flat and enlongated. Larger fragmen any indication of bedding or structure. F weakly with acid unless crushed.	s, fragments its do not have	Trdl				60% 60% 60% 60% 60% 60% 60% 60% 60% 60%	Open hole
	_	Variable calcite concentrations.							
S-MW9.bor	660-								
	665—								
	670								
og/BoringLogES	675—								
S-MW9\boring I	680								
DrillWellInstall\E	685—								
smoky/FieldNotes	690								
04-01-2015 S:\.\obs\0442-004-900-Simplot-Smoky FieldNotes_DrillWellInstal\\ES-M\\9\boring log\\BoringLogES-\M\\9.bor	695								
bs/044	700-								
04-01-2015 S:\Jo	remove parame	114 the WL=163' bgs and the borehole was air-life approximately 6 borehole volumes while monitoreters. At the completion of air-lifting a sample was ad for the constituents listed on Table 4 of the Ea	oring groundwater quali as collected and		e borehole h a welde		8-inch casing in	n place ar	nd a two foot stick-up





6995 Sierra Center Parkway Reno, Nevada 89511 www.stantec.com Client/Project

BLM AND USFS
EAST SMOKY PANEL MINE EIS
CARIBOU COUNTY, IDAHO

Title

MONITORING WELL GW-29 AS-BUILT CONSTRUCTION SCHEMATIC



LOG OF BORING GW-30

(Page 1 of 3)

BLM and USFS East Smoky Panel Mine EIS Date Started

: 7/29/2015 : 8/3/2015

Sampling Method Ground Elevation : See Reports : 7124 ft NAVD88

Caribou County, Idaho

Date Completed **Boring Diameter**

: 12"

Total Depth Logged By

: 534.5 ft · Dana Hutchins

				Drilling Contractor Drilling Method	: Thomas Drilling : Air Rotary	Logged By	: Dana Hutchins		
Depth in Feet	Rock Type (see key)	GRAPHIC			DESCRIPTIO	ON			
0		595759575855	0-28' COLLUVIUM	(CO), consists of 40-	85% gravel, 5-40% fines	, and 10-20% sand. Cla	ests composed of light		
20-	со		0-28' COLLUVIUM (CO), consists of 40-85% gravel, 5-40% fines, and 10-20% sand. Clasts composed of light reddish brown (5YR4/6 Munsell) SANDSTONE with trace LIMESTONE, black CHERT, and DOLOMITE.						
LS-SS-CL 28-35' 80% LIMESTONE (LS), 10% SANDSTONE (SS), and 10% CLAY (CL), light gray to tan (label brown (7.5YR 7/4 Munsell) (SS) and (CL). Limestone has undergone partial dolomitization and control of the control o							to tan (LS), light on and contains trace		
-	SS-LS			TONE (SS) and 50%	n (7.5YR7/4 Munsell), co 6 DOLOMITIC LIMESTO				
60-	SS		55-70' 100% SAND are subangular and	STONE (SS), light ta 1-15 mm in diamete	ın (7.5YR7/4 Munsell), w r.	ith trace LIMESTONE a	nd CHERT, cuttings		
80	LS-SS			ONE (LS) and 20% ingular and 1-15 mm	SANDSTONE (SS), light in diameter.	gray (LS), light tan (SS). Cuttings are		
100-			subangular to angu	DY DOLOMITIC LIM lar and 1-10 mm in d		(5Y7/1 to 5Y8/2 Munse	III), Cuttings are		
120-	LS		140-145' Trace blac	k CHERT.					
160-	LS-SS			tan (5Y8/4 Munsell)) and 50% CALCARIOUS (SS). Cuttings are subrou				
180	165-185' 100% LIMESTONE (LS), light gray (5Y6/1 Munsell), some weathered edges. Cu subangular and 2-8 mm in diameter.						uttings are		
200	185-200' 50-60% LIMESTONE (LS) and 40-50% SANDY LIMESTONE (LS), light gray (5Y7 light tan (2.5Y6/6 Munsell) (SANDY LS). Cuttings are subangular to subrounded and 1-15 r								
Note: bgs = be mm = m ft = feet	Note: Depth to water was 488.45' bgs on 8-11-15. Borehole produced 10-15 gpm prior to well installation. mm = millimeter						lation.		



LOG OF BORING GW-30

(Page 2 of 3)

BLM and USFS East Smoky Panel Mine EIS Date Started

: 7/29/2015 : 8/3/2015

Sampling Method Ground Elevation

: See Reports : 7124 ft NAVD88

Caribou County, Idaho

Date Completed Boring Diameter

: 12"

Total Depth

: 534.5 ft

	Caribou County, Idano				Boring Diameter Drilling Contractor Drilling Method	: 12" : Thomas Drilling : Air Rotary	Total Depth Logged By	: 534.5 ft : Dana Hutchins			
	Depth in Feet	Rock Type (see key)	GRAPHIC			DESCRIPT	TION				
	200			200-280' 100% LIM	200-280' 100% LIMESTONE (LS), light gray (5Y7/1 Munsell), Cuttings are subangular and 1-5 mm in						
	220-			diameter.							
pod.	240-	LS									
3W-30	1			250-255' Cuttings a	ire flat.						
cs/ES (260-			260-265' Contains 4	40% quartz crystals						
gs geo	- 1			270' Some SANDY 270-280' Drilling is							
280 LS-SS 280-290' 50-80% LIMESTONE (LS), 20-50% SANDSTONE (SS), light gray (5Y7/1 Munsell) (LS), l							ell) (LS), light tan				
tion/Bc	+	20.00		diameter.				/			
nforma	300			290-370' 100% SAI weathered edges, v	NDY LIMESTONE (Liveak to strong reaction	S), light gray (5Y7/1 Me on to HCL. Cuttings are	unsell) to light tan (10YR8/ e subangular and 1-5 mm in	3), contains some n diameter.			
I Log I	=										
ky_Dni	-										
st Smo	320	}									
ron/Eas	-	LS									
	340										
Smok	1			350-355' Increase i	n sand content.						
D\East	360-										
-MEDA	300-										
10-16-2015 V:\2037\active\203713454\07_pre-MEDAD\East Smoky				370-400' 100% LIM	IESTONE (LS), light	gray (5Y7/1 Munsell) to	gray (5Y5/1 Munsell), trac	ce black CHERT,			
13454\	380	LS		Some weathered et	agoo. Gullings are al	igalar to suballyular all	a . 4 mm in diameter.				
3/2037	-	LO									
'Vactive	400-										
7:/2037	Note:										
2015 \		ogs = below ground surface Borehole produced 10-15 gpm prior to well installation. mm = millimeter									
10-16-2	ft = feet gpm = gallons per minute										



LOG OF BORING GW-30

(Page 3 of 3)

BLM and USFS East Smoky Panel Mine EIS Caribou County, Idaho

Date Started

: 7/29/2015 : 8/3/2015

Sampling Method Ground Elevation : See Reports : 7124 ft NAVD88

Date Completed Boring Diameter **Drilling Contractor**

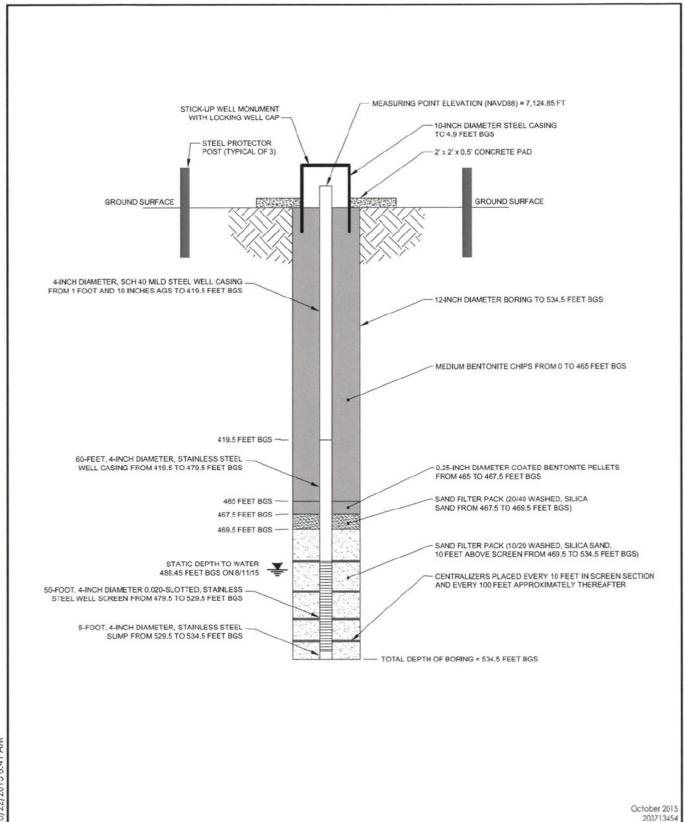
: 12" : Thomas Drilling Total Depth

: 534.5 ft

Logged By

: Dana Hutchins

		ya	Drilling Method : Air Rotary
Depth in Feet	Rock Type (see key)	GRAPHIC	DESCRIPTION
400-			400-445' 100% SANDY LIMESTONE to LIMESTONE (LS), light gray to light tan (10YR8/2 Munsell), trace
420-	LS		black CHERT. Cuttings are subangular to angular and 2-8 mm in diameter. 410-415' Apparent fractured zone indicated by large angular cuttings.
ৰু 440-			
ohics/ES GW-30	LS-CH		445-465' 30-80% LIMESTONE (LS), 20-40% CHERT (CH), and 0-30% SANDY LIMESTONE (LS), light gray to gray (5Y6/1 Munsell) (LS), black (CH), light tan (10YR8/2 Munsell) (SANDY LS). Cuttings are angular to subangular and 1-5 mm in diameter.
on/Boring logs geogral			465-525' 100% DOLIMITE to DOLIMITIC LIMESTONE (DO-LS), light gray to light tan (10YR8/4 Munsell), trace balck CHERT. Cuttings are angular to subangular and 1-8 mm in diameter.
2 Drill Log Information	DO-LS		First water observed at 495' bgs. Flow was estimated using recharge of first observed water in boring during drilling following airlifting at 0.09 gpm on 8-2-2015 when bottom of boring was at 495' bgs.
520-	-	444	
yon/East S	LS-CH		525-534.5' 60% LIMESTONE (LS) and 40% CHERT (CH), light tan to gray (10YR6/2 Munsell) (LS), black (CH), contains some secondary quartz veins. Cuttings are angular and 2-10 mm in diameter.
540-	-		Bottom of boring is at 534.5' bgs. Flow was estimated at 10-15 gpm during air lift test prioir to well installation.
VEast Smoky			
560-	1		Note: Daily drilling footage summary:
0-16-2015 V:\20037Active\\2003713454\07_pre-MEDAD\\East Smoky Canyon\\East Smoky_Drill Log Information\\Boring logs geographics\\ES\GW.30.bor April Log Information\\Boring log Information\Boring log Information\\Boring log Information\Boring			0-85 ft bgs drilled on July 29, 2015; 85-225 ft bgs drilled on July 30, 2015; 225-345 ft bgs drilled on July 31, 2015; 345-465 ft bgs drilled on Aug 1, 2015; 465-500 ft bgs drilled on Aug 2, 2015; 500-534.5 ft bgs drilled on Aug 3, 2015.
€ 600 –	-		
Note: bgs = b mm = n ft = feet gpm = g	pelow groun millimeter t gallons per		Depth to water was 488.45' bgs on 8-11-15. Borehole produced 10-15 gpm prior to well installation.





6995 Sierra Center Parkway Reno, Nevada 89511 www.stantec.com Client/Project

BLM AND USFS EAST SMOKY PANEL MINE EIS

CARIBOU COUNTY, IDAHO

Title

MONITORING WELL GW-30 AS-BUILT CONSTRUCTION SCHEMATIC